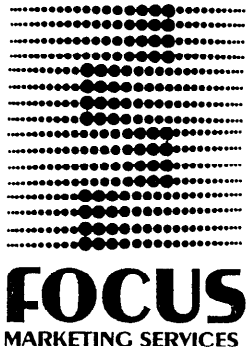

NATIONAL RENEWABLE ENERGY LABORATORY
SOLAR WATER HEATING SYSTEMS FOR THE NEW HOME MARKET

DELIVERABLE 8:
DRAFT FINAL REPORT DOCUMENTING RESULTS FROM ANALYSIS OF TASK 2 QUALITATIVE RESEARCH, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS TO NREL & THE SOLAR INDUSTRY

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BACKGROUND AND OBJECTIVES

While technology and aesthetics of solar water heating units and panels have greatly improved during the past twenty years, the number of homeowners installing them has not grown as dramatically.

Currently, the National Renewable Energy Laboratory (NREL) and the California Solar Energy Industries Association (CAL SEIA) are working together in an effort to develop effective strategies that will grow this industry.

To this end, a large scale research study has been commissioned that involves gaining a better understanding of the marketplace from the perspective of home builders and architects, and from the perspective of home buyers.

In order to gain this understanding among home buyers, qualitative research was conducted as a first step in exploring this consumer segment. Research was conducted among both users and non-users of solar water heating systems.

Objectives of this research among non-users were to:

- Gain an understanding of consumer awareness and images of solar water heating systems.
- Identify the extent or lack of consumer knowledge and understanding of solar water heating systems.
- Identify the key barriers to purchase and ways to generate increased purchase interest.
- Determine the purchase interest levels in newer, more attractive solar systems.
- Provide input and direction in development of a quantitative questionnaire to be used for the second phase of home buyer research.

Objectives of this research among solar users were to:

- Gain a better understanding of the solar system shopping and purchase process.
- Identify key areas of satisfaction and dissatisfaction with their solar systems.
- Obtain input on the appearance of the newer, more attractive solar systems.

METHOD

The method used for this qualitative research was as follows:

Who: Five focus groups were conducted across three states. Twelve respondents were recruited to participate in each discussion. However the numbers who actually participated in each group were:

	Orlando, FL	Phoenix, AZ	Sacramento, CA
Solar Users	(no group)	10 respondents	8 respondents
Solar Non-Users	10 respondents	9 respondents	9 respondents

Screening criteria for all non-users were:

- Not employed in the real estate/building/energy industry
- Never owned a solar water hater
- Planning to purchase a new home within the next two years
- Have visited two or more new home communities in the past six months
- Mix of home size/price ranges according to market
- Not completely opposed to using solar energy
- Mix of household sizes and incomes

Screening for all solar users were:

- Not employed in the real estate/building/energy industry
- Currently use a solar water heater
- Mix of new versus retrofit solar users
- Have used solar two or more years
- Mix of home size/price ranges according to market
- Not completely dissatisfied with using solar energy

When: The focus groups were conducted based upon the following schedule:

Orlando, Florida – November 5, 1997
Phoenix, Arizona – November 6, 1997
Sacramento, California – December 11, 1997

All focus groups were conducted in the evenings at specially equipped focus group facilities. Each discussion lasted 1½ hours. All groups were audio and video taped.

Discussion Areas: (See Appendix for detailed discussion guides)

Non-user discussion areas included:

- Awareness and image of solar water heating systems
- Purchase interest and reasons for interest
- How home buyers would approach purchasing a solar water heating system
- Feelings toward solar energy political issues and Million Solar Roofs Initiative
- Reactions to different types of solar water heating systems (See Appendix for photos)

Solar user discussion areas included:

- Purchase process for obtaining solar
- Type of system installed
- Solar usage and maintenance
- Feelings toward their solar systems
- Reactions to different types of solar water heating systems (See Appendix for photos)

CAVEAT: This research is qualitative in nature, and like all qualitative research cannot be projected to the population at large. Results should be used for direction and insight only.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION 1:
The solar energy industry faces an enormous communications job of educating the public and "damage control" among the large majority of non-users and among some current users as well.

- Solar water heating is not a top-of-mind product. When purchasing a new home, respondents do not even think to ask about solar water heating. They are more concerned with finding the right home, and then take whatever water heater it comes equipped with. They also note that none of the communities they have visited offer solar water heating as far as they know.

- When asked about solar water heating systems, respondents across all three markets admit they have little knowledge of solar energy. And the images they do have of solar equipment are negative in terms of appearance, function, maintenance and cost. For many, solar energy is something they consciously reject.

- Further, some users and non-users relate stories of having friends with older solar equipment on their homes that they do not even use due to ongoing maintenance problems. Many of these users are apparently so "turned off" by solar that they would be unlikely to enter the solar arena in the future.

CONCLUSION 2:
Demonstrating both short and long-term money savings that are possible when using solar water heating in a straightforward and believable manner is the key to increasing sales of these systems.

- Saving money is clearly the primary purchase motivator among both solar users and non-users. Many of the users interviewed began using solar many years ago when the government offered significant tax benefits. All of these solar users agree that they decided to purchase their system to save money on their energy bills.

- Because non-users express strong concerns about the appearance, reliability and maintenance expenses associated with solar systems, they would expect substantial money savings as a purchase incentive.

CONCLUSION 3:
In addition to money savings, the solar industry needs to clearly communicate the facts that the new solar systems come with strong warranties and are relatively maintenance free.

- Current perceptions among non-users are that solar systems require a fair amount of maintenance, with repairs that are large, inconvenient and costly. They also perceive many solar providers to be "fly-by-night" companies that do not follow through on the warranties.

- Conversely, those who are solar users view their systems to be low maintenance, and for the most part do not complain about having to make repairs or having to replace their systems.

- When analyzing whether it makes financial sense to consider a solar system, non-users tend to factor in their exaggerated maintenance figures, which work against purchase interest levels.

CONCLUSION 4:
Both users and non-users of solar water heating systems agree that it is nice to do what you can to help the environment, but did not/would not base their purchase decision upon environmental factors.

- While non-users understand that using solar energy instead of natural gas or electricity is beneficial to the environment, it is not a compelling selling point when it comes to heating their household water.

- Further, most respondents, especially those who heat their water with gas, do not believe that their household water heaters are big pollution generators. They feel that there are many worse polluters in the environment that should be dealt with, before worrying about their water heaters.

CONCLUSION 5:
The building industry could clearly make a big impact in the use of solar water heating if they chose to do so, without hurting their home sales. However, builders will need to install solar systems as standard equipment, or at a minimum show the systems in their model homes along with information about the long-term money savings.

- After being exposed to the newer solar panels, non-users unanimously agree that they would not steer away from a home equipped with this type of system, especially if it saved them money.

- However, as it stands now, consumers are unaware that solar water heating is even an option in a new home community. And even if it were an upgrade option, it is not something these home buyers would be likely to add based upon their current misperceptions of solar water heating.

- While these non-users prefer to have the choice of whether their home will be equipped with solar, they would accept solar if offered as a standard on a home. However, most would be suspicious of a builder offering solar water heating as an upgrade, assuming they were pushing this equipment as an added profit center, rather than as something beneficial for the buyer.

- Consumers are also much more likely to purchase a solar system from the builder as the home is being built because they view the installation as being much more simple and safe in terms of the roof warranty during the construction stage. Additionally, consumers are unlikely to dispose of a gas or electric hot water heater that is in good working condition.

CONCLUSION 6:
The reputation of the installer and the length of time they have been in business is more important than the actual brand name or type of equipment offered in the solar energy industry.

- Both solar users and non-users agree that they are more interested in the reputation of the installer than they are in the actual equipment. Specifically, they want to know that the company has been around for a long time, and will be staying in business. They also want to know that the installer will stand behind his product and provide servicing when needed.

- Because there are no leading brand names in the solar industry, respondents are not looking for a brand. Instead they are more interested in learning about what type of equipment will be needed to provide hot water for their individual household. Unless some big national name appliance company decided to make a strong entrance into the solar water heating category, the brand name will remain secondary in importance to the reputation of the installer.

CONCLUSION 7:
The newer versions of solar panels are significantly more appealing to both users and non-users than the older, larger panes. However, they do raise concerns regarding capacity and efficiency due to their much smaller size.

- The new panels that look like skylights are very well received, and clearly overcome any objections to appearance that are raised. And, the more they blend in with the roof overall, the more appealing they are.

- However, while these new solar versions address appearance concerns, and even minimize some of the maintenance concerns among non-users, most still need to be convinced that these systems make financial sense.

- While users have learned to see beyond the appearance of the larger systems, they clearly prefer these new, more attractive systems. Most feel that when their current system needs to be replaced they will look into purchasing one of these smaller set-ups.

CONCLUSION 8:
While the majority of the users who participated in these groups are extremely satisfied with their solar experiences, they may only represent one side of the solar user marketplace – those who continue to use their systems.

- For the most part, the users who participated in these focus groups are very committed to solar energy. They feel that they experience substantial savings, while helping the environment.

- However, those who inherited their solar systems when they purchased their homes are less satisfied with solar. And several users admit that if they moved to an area where gas heating was available, they would be less likely to purchase solar again.

- Many respondents, both users and non-users know people who have had such negative experiences with solar in the past that it will be a huge uphill battle to get those consumers to try solar again, not to mention the negative word-of-mouth generated by these consumers.

RECOMMENDATIONS

- Develop a strong incentive program for builders to develop communities where all homes have the new skylight type of solar panels and systems. Once new home owners begin to have positive experiences with solar energy, word-of-mouth will begin to spread among older home owners.

- Develop and enforce strong standards within each state that all solar providers must adhere to. Once potential buyers are convinced that their providers are knowledgeable, reliable and stand behind their products some resistance to installing solar may diminish.

- Marketing efforts should be initially directed both in new home communities, and in areas where only electricity is available. Because consumers like the idea of installing solar when the home is being built, this seems appropriate. Also, because electricity is more expensive than natural gas, those who are tied into electricity may be more interested in solar because they will save more money.

- Solar water heating systems should also be sold in distribution outlets where traditional gas and electric water heaters are sold. Because most consumers do not think about replacing their water heaters until they have a problem, and because top-of-mind awareness of solar water heating is so low consumers tend to replace their older water heaters with a newer version of the same thing. If solar were offered as an option from the supplier they naturally call, more systems may move within the resale home market.

- Information clearly outlining the short and long-term financial benefits to owning a solar water heating system, along with visuals of the attractive new systems, should be readily available at home shows, new home communities, and retail outlets where water heaters are sold in order to build awareness and interest in the category.

SOLAR USERS

SOLAR WATER HEATING SYSTEM PURCHASE PROCESS

Almost all of the solar users interviewed in both Phoenix and Sacramento made a conscious decision to install solar water heating systems in their homes, primarily as a means of saving money on their energy bills. Those who are long-term solar users initially became interested in solar due to tax incentives being offered at the time.

Source of Awareness and Interest

- Many of these respondents have been using solar since the 1970's. They originally became interested in solar energy via several sources, including the well publicized 1970's tax credits, from friends, and from home shows. Once they owned a solar water heater, these respondents either replaced the units on their same home, or purchased a new unit for their new home as time has passed. Only a couple of these respondents purchased homes that came pre-equipped with a solar water heater.

  "My old heater was going bad, and I wanted the most energy efficient thing and SMUD had a program."

  "We were invited to a home show where they were selling solar units and explaining about the tax credits of the 1970's."

  "It just came with the house."

- Many of these solar users also indicate that they are interested in energy conservation primarily for money savings, and secondarily for environmental reasons.

  "We just wanted to save money."

  "My uncle told me to get solar if I wanted to save a lot of money, because it is cheaper than electricity."

  "We needed a new heater, and wanted to help the planet."

Reasons for Selecting Solar

- The primary reason for selecting a solar water heater is unanimously to save money. All of these solar users admit that helping the ecology is a secondary factor in their purchase decision.

  "Why pay for the electricity when the sun is free?"

  "We just wanted to save money."

  "Ecology was important, but secondary."

- Because many of these respondents were formerly using electricity to heat their water, solar offered them significant money and energy savings.

  "There is no gas available in our area and electricity is expensive, so solar just made sense for us."

- The appearance of the solar panels is not a concern with any of these users, especially if their panels are installed on the back side of their home. However, some users admit that the appearance was initially an issue, but not more important than saving money.

  "The appearance is really an afterthought."

  "After a while you don't even notice it."

- Most of these respondents feel the monthly savings are more meaningful than the long-term savings, especially in the Summer time when utility bills are higher due to air conditioning.

Shopping for and Selecting a Solar System

Most of these users purchased a system after investigating alternatives offered via traditional marketing methods, such as the Yellow Pages, home shows, and word-of-mouth. Solar users then selected a system based upon the reputation and knowledge of the installer more than upon the actual equipment being sold to them.

- The majority of the Phoenix solar users looked in the Yellow Pages to find a solar water heater, and did not have a specific brand they wanted. A couple of respondents have friends in the solar business that they used to install their systems.

  "We looked in the Yellow Pages, and called some places."

  "We looked at lots of alternatives."

- Many of the Sacramento users initially spoke with representatives from SMUD to identify the types of systems available, and to get a list of solar providers.

  "SMUD showed us costs from each supplier, then we called some."

- When selecting a system, solar users were more concerned with the quality and reputation of the installer, than with the brand name on the equipment. They were also more concerned with the performance and structural issues of the equipment than with the appearance.

  "The longevity of the company and installer were of more concern to me."

  "My installer is a mechanical engineer and was highly recommended."

  "I was looking for the most serviceable unit – it didn't matter what it looked like."

  "I didn't want to worry about it. I just want to have hot water there."

  "I was concerned about the weight on the roof, not with the appearance."

- Several of these respondents indicate that their current unit is a replacement for an older system, and note they tend to replace their damaged panels with exact duplicates. However, some feel that in the future they might want a more updated system.

  "We replaced ours with what was already there. We were happy with what we had."

  "I'm not sure whether I'd buy the same thing. I'm sure they've come a long way since my unit was installed."

TYPE OF SYSTEM INSTALLED AND MAINTENANCE REQUIRED

Most people do not know that much about solar energy, and there is no well known national solar equipment company. Consequently solar purchasers trust their solar provider to install equipment that will work well and be maintenance free, with little regard for brand name or style of equipment.

- The brand name of the equipment is not of concern to these solar users. Most solar users can tell you who installed and maintains their system, but do not know the manufacturer name on the equipment. Some Phoenix respondents know that their systems are made by Solaire or by Solarheart, but did not select the system because of the brand name. Many respondents indicate that their systems are made up of parts from several different companies.

  "I was looking for the most serviceable one. I didn't care what brand or what it looked like."

  "The brand did not matter. I was looking for a good installer and at the longevity of the company."

- Phoenix respondents are split between using their solar in conjunction with gas or with electricity, while almost all Sacramento respondents have electric back-up systems.

- The number of panels installed ranges between two and four, depending upon the number of people in the household and size of the home.

Most of these solar users are very satisfied with their systems because they require little maintenance, both in terms of time and money.

- These solar users describe their systems as being very low maintenance, both in terms of costs and convenience. Almost all simply service their system once a year, and spend $75 or less to do so.

  "Once a year is sufficient."

  "I just wash the panels a couple of times a year – hose it down."

  "I also clean the leaves out around it occasionally."

- When their solar systems do need outside maintenance, they contact the installer for help, and have found the repairs to be relatively inexpensive. The only high cost maintenance is on the rare occasion that a pump or panel needs to be replaced.

  "It cost us $50 to repair some parts one time."

  "I have an annual service contract."

  "My Maintenance bill is zero."

FEELINGS TOWARD THEIR SOLAR SYSTEMS

For the most part, these solar users are extremely satisfied with their water heating systems. They enjoy the money savings and feel good about helping the environment.

- Most of these solar users have no idea how much energy they save each month. Instead they focus on money savings, with Sacramento solar users stating their monthly money savings range between $12 to $20, while Phoenix respondents feel they save between $30 and $60 monthly. Some users admit that they have no idea how much energy or money they save each month.

  "The savings are important, even if I don't know the exact dollar amount."

  "I've had solar so long that I couldn't tell you what I'm saving."

- When asked what they like about their solar water heaters, respondents indicate a number of advantages to solar beyond the money savings, including:

  - You don't worry about running out of hot water.
  - It's very efficient.
  - It's free energy.
  - It helps the resale on the house.
  - No wait for the water to heat up – it's instant.
  - You don't have to think about it – the hot water is just there.
  - There is no pilot light to worry about.

- Most solar users feel good about helping the environment, and feel that everyone should do what they can to help. However, most have no idea how much pollution it saves.

  "If each one of us uses less energy, then it adds up."

  "It's not something I think about."

Because satisfaction with solar water heating is high among these users, the large majority of them would shop for, and possibly finance a new system on their next homes as well.

- Solar users who chose to install their current system would definitely install solar on their next home in order to save money and help the environment. These users recognize that the initial cash outlay is substantial, but the investment is worth it. However, those who inherited their solar systems feel that they might not purchase solar again if they could heat their water with natural gas, which is less expensive than electricity.

  "It's a little sticker shock when you first look at it, but as a long-term investment it pays out."

  "It's the 'green' thing to do."

  "I like always having plenty of hot water."

  "If I had a gas water heater in my next home, I might not install solar."

- While these respondents are happy with their current solar systems, and would consider purchasing the same system again, they would probably shop around before purchasing a new system. Further, the majority of Sacramento respondents would want to pay cash for the system, rather than finance it on their mortgage, while most Phoenix respondents would finance their new system.

  "I'd look to see what's offered now and price it out."

  "They are not that expensive. Why pay interest on it for thirty years?"

  "I would only finance it if I couldn't afford the house I wanted.

- Sacramento users discussed the notion of builders offering energy efficient packages, including double pane windows, top quality insulation, energy efficient appliances, and solar water heaters. They feel this type of upgrade option would be very appealing if it wasn't too expensive.

While satisfaction with solar is generally strong, respondents do express a few dislikes, and relate negative feelings toward solar among other users.

- Although satisfaction with solar is high among these users, respondents would like to see a few mechanical improvements, including:
  - Not freezing up if you go out of town for a couple of days, and are not constantly using it.
  - An indoor indicator to let you know everything is working.
  - A window to allow you to see the level in the flowback tank.

- Some of these respondents do note that they know other homeowners with solar systems who have had very negative experiences with their older units, and are consequently very turned-off to revisiting solar technology in the future.

  "I know several people with those big, ugly, old fashioned things. Those people had so many problems, you'd never get them to purchase solar again."

  "I've recommended it to friends, but they still think of those big, ugly things."

- Most of these solar users have recommended solar to their friends, emphasizing the money savings to be had. However, even these solar users admit that this equipment is not something you would just run out and purchase unless your current water heater needs to be replaced or you were building a new home.

Respondents feel that builders should not only offer a solar water heating option, but they should also consider offering an entire "energy efficient household" package.

- When asked about purchasing a solar water heating system for a new home, respondents agree that they would probably purchase it from their builder for warranty purposes. They also suggest that their builder offer an upgrade package that includes energy efficient windows, insulation, appliances, and water heating.

  "My builder limited where I could look."

REACTIONS TO PHOTOGRAPHS OF ALTERNATE SOLAR PANELS

Respondents were very receptive to the newer, smaller types of solar panels that are available, but they express concern about the capacity being too little.

- Respondents were shown several different new styles of solar panels, and one photograph of the traditional style of panels. (See Appendix for photographs.) Based upon the comparisons, respondents feel that any of the new systems are a vast improvement visually over the large older panel systems. However, many of these respondents express concern that these smaller panels will not produce enough hot water for their entire households.

  "This looks nice and clean."

  "I like the way it looks like it is built into the roof."

  "This is beautiful."

  "I like the way it blends in with the roof.

  "Does this heat the whole house?"

  "It looks like you'd run out of hot water before you get to the shower."

- Reactions to the photographs of the newer types of solar panels were overwhelmingly positive, especially when compared to a photo of the older panels. While these respondents have accepted the appearance of the larger panels that are currently on their roofs, they agree that these new panels would be preferable, as long as they performed equally well.

  "If the smaller ones work as well, why would you select a larger, more complicated system?"

  "If all else is equal, the flatter the better."

  "The ones that blend in with the roof are the best. They look like quality."

- Respondents admit that they would select the smaller panels over the larger ones even if they would not save as much each month, primarily because it would be better for resale purposes.

  "The resale would be better on the house with these types of panels."

SOLAR NON-USERS

AWARENESS AND IMAGE OF SOLAR WATER HEATING SYSTEMS

Homeowners are aware that solar water heating systems exist, and most have seen panels on the roofs of homes. And while these consumers admit that they have little or no real knowledge about solar water heating, most of their impressions about using solar energy are negative. Specifically, their impressions of solar systems are that they are expensive, problematic and unattractive pieces of equipment to own and maintain. Some also express concerns about whether solar will provide enough hot water for their household needs year around.

Awareness

- Most of these consumers admit that they do not really know that much about solar water heating systems. For many, the extent of their knowledge lies in having seen big panels on roofs of homes, possibly for pool heating. Some have heard of solar water heating from friends who have it or from home shows, but do not know much about it other than the fact that it is available.

  "There's not a lot of information out there. You'd have to seek it out."

- Despite the fact that all of these respondents across all three markets have recently looked at numerous new home communities, none have been shown or offered a solar system by any builders.

Appearance

- Non-users have very strong negative feelings toward the appearance of solar panels. In general, their impression of solar panels in terms of appearance is that they are big, unattractive panels that are described in various negative ways. It is important to note that non-users are not able to differentiate between panels used for heating pool water versus panels used to heat household water. To non-users they are all simply ugly panels that detract from the appearance and value of the homes and communities.

  "They are so big and tacky."

  "They are like sliding glass doors lined up on your roof."

  "They look so industrial and ugly on top of the house."

  "The ones I've seen are lunar looking things."

  "How would you ever resale a house with that big, ugly thing on top?"

Impressions of How Solar Water Heating Works

- Non-users raise many questions in regard to how a solar system works. The impressions they do have are generally that of complicated, problematic equipment.

  "I don't understand how it actually works."

  "Our water is corrosive. How does this effect the pipes?"

  "I'm not sure how the heat is stored."

  "How do you control the level of heat."

  "Do I need a separate storage tank?"

  "Aren't the systems very involved, with circulators and pumps?"

  "You would have to drain it in the winter so it doesn't freeze and break."

  "Don't these need special roofing support?"

  "They require a maze of plumbing."

- Further, these non-users express concerns as to the effectiveness and efficiency of solar water heating systems.

  "You would have to have a back-up system, especially in the winter."

  "Wouldn't it have to be really big to provide enough hot water?"

  "Can you take a shower, do laundry, and wash dishes all at the same time?"

Perceived Maintenance of Solar Systems

- While non-users are not sure what type of maintenance is required for a solar water heating system, the perceptions among most are that the systems do require substantial maintenance and repairs. Many non-users express concerns regarding major types of repairs, such as replacing panels, repairing roof damage, or pumps breaking.

  "I worry about roof leaks."

  "I have not a clue what it takes to maintain this."

  "You would have to drain and refill it a couple of times a year."

  "If something goes wrong, it could cost a lot of money."

  "It's not like a regular water heater that you just forget about until you have a problem."

  "This is a big commitment to install on your roof. I don't want to get tapped later on."

- Another maintenance concern is the reliability and stability of the service providers. Most respondents feel that solar providers are no-name companies that may not even be around when you need them in a few years. They express concern regarding the lack of any big brand names or big name solar providers in the area.

  "Is this company going to be around for long? I always think of these fly-by-night companies."

  "Why aren't there any big providers around here, and why don't more homes already have solar on them."

  "It would be hard to get serviced, and I can't do it myself."

- Some respondents across all markets express concerns regarding damage to panels due to hurricanes (Orlando), heavy winds (Phoenix), or freezing (Sacramento).

  "The panels freeze and crack in the cold weather."

  "This could really mess up your roof in a storm."

  "I'd want to check for damage after every storm."

Perceived Costs of Solar Systems

- The perceived costs of a fully installed solar water heating system varies slightly across markets, with the following price ranges being guessed at:

  Orlando - $2,000 to $5,000
  Phoenix - $1,000 to $3,000
  Sacramento - $3,000 to $5,000

- While non-users agree that it will be less costly to install solar during construction, they express concern about builder mark-ups.

  "Builders should offer solar as a standard, because if it's an option, you know they're going to mark it up a lot. Builders overcharge for everything."

  "You always pay twice what it's worth to builders."

  "Builders just care about their kick-backs, not if they are selling the best one."

- Some respondents also express concern regarding the hidden costs of replacing parts over time, and possibly higher homeowners insurance rates because of the added equipment.

  "Is my homeowners insurance going to increase each time the panels get damaged in a storm?"

ANTICIPATED AND REQUIRED MONEY SAVINGS

Because these respondents express concerns about the appearance, reliability and maintenance of solar water heating systems, they expect substantial money savings and/or tax benefits as a purchase incentive. Respondents who use gas water heaters are convinced that their savings would be so minimal that they would be meaningless, while those who use electric heaters are somewhat more open to the idea of using solar.

- Respondents who currently use gas water heaters across all markets feel that they are spending very little each month to heat their household water, and consequently are not looking for a way to save money – whether it be solar heating or any other method.

  "We heat with gas which isn't as expensive as electric. So to convince me, I'd have to save a lot to take on all of the downsides of solar."

  "Most of our gas bill is from the furnace, not from the water heater."

  "We would only save about $40 to $50 a year, which is not that much."

- Non-users across all markets feel that they would need to see substantial money savings before considering installing a solar water heating system in their next home. Specifically, the savings would need to be enough to justify the investment in the solar equipment.

  "There would have to be a big savings."

- Most Phoenix respondents are unaware that they can still receive tax credits for installing solar. And, once informed of the actual credit offered, feel it is not enough.

  "In the 70's it was great. They offered all of these tax credits."

  "Twenty-five percent is not enough. You wouldn't even get that much back unless you bought a very big system."

- Non-users in Orlando and Sacramento also note that the significant tax credits from the 1970's are no longer being offered, which takes away much of the incentive to even consider solar.

- When asked about various financial scenarios, respondents indicate that they would only be interested in solar if assured of substantial savings each month. The notions of taking advantage of the sun, using clean energy, and reducing pollution are not strong enough motivations, without substantial financial savings.

  Non-users unanimously would not purchase a solar system if the incremental costs per month were only partially offset.

  "I don't need to feel good about helping the environment. I want savings."

  "This would make it difficult to resale the house."

  Further, non-users unanimously would not purchase a solar system if savings from solar would simply break-even with the incremental costs per month.

  "You still have the costs of upkeep over the next ten to thirty years."

  "Why have all this extra stuff on the roof if it's not doing anything for you?"

  "It's just another thing to go wrong or replace in ten years."

  "How many years will the unit last? It won't be thirty years."

  Some non-users may consider purchasing a solar water heater if the savings from solar exceeded the incremental costs per month. But they would need to be reassured that a strong warranty came with the system.

  "It depends upon the warranty and the life expectancy of the unit. You could spend the savings quickly with the repair expenses."

  "The savings would have to be substantial ($50-$60 per month) and you would have to show me the warranty and replacement costs. Why install that ugly thing otherwise?"

  "Why would I do all of this to save just five dollars a month?"

  "It would depend on the life of the unit, and how quickly I would get paid back."

ATTITUDES REGARDING HELPING THE ENVIRONMENT

Approaching these consumers from an environmental standpoint may be futile, given that many do not relate to environmental issues and/or they are skeptical of this type of information. Specifically, they do not believe that using solar energy will make that big of a difference environmentally.

- Many of the Phoenix non-users express a lack of concern for the environment in terms of considering solar water heating.

  "I'm not worried about the ozone layer."

  "It's hard to relate to environmental issues. Give us something practical like saving money."

  "If we cared that much, then we'd already have solar."

- Further, these consumers simply do not think of the energy they use to heat their water in terms of the amount of pollution it creates. Nor do they clearly understand the translation.

  "We don't think about energy in terms of pounds of pollution."

  "I'm always skeptical of those numbers that are presented in pounds or percentages saved."

- Among those who use natural gas to heat their water, they do not view their water heaters as big polluters. Some of these non-users rationalize their lack of interest in solar by noting that burning gas is not as bad for the environment as using up electricity.

  "You would have to intrinsically want to do something for the environment in order to change."

  "Burning natural gas is not that bad for the environment."

IMPORTANCE OF PURCHASE CONSIDERATION FACTORS

While the importance of various purchase consideration factors varies slightly across markets, non-users all agree that the most important factors relate to the financial implications of purchasing a solar water heater – not to the environmental factors.

- Respondents were asked to rate the importance of a number of purchase consideration factors on a scale of 1 to 5, where a one represents "not at all important" and a five represents "extremely important." Factors rated as primary, secondary, and of less importance across markets are as follows:

	Orlando	Phoenix	Sacramento
Primary:	Monthly cash flow Overall installed price Maintenance required Warranty Long-term savings Tax benefits	Maintenance Warranty Monthly cash flow Tax benefits Overall installed price	Overall installed price Monthly savings Appearance Warranty Maintenance Monthly cash flow
Secondary:	Brand name Appearance Helping environment	Appearance Helping environment	Helping environment Brand name
Lesser:	Builder recommend	Builder recommend	Builder recommend

- Items of key importance across all markets relate both to initial cash outlay, and to longer term financial needs. Specifically, non-users are concerned with the overall installed price and the monthly cash flow initially. Subsequently, they hesitate to consider a solar system fearing that maintenance will be high, and that the warranty may not cover replacing major parts if needed. Most respondents agree that the warranty should cover all parts for at least three years.

- These respondents view helping the environment almost as something of a side benefit to using solar, rather than a reason to purchase a solar system. They would only consider installing a solar water heater if it made financial sense, and once they decided to install solar they could then feel good about helping the environment.

- Brand name is of secondary importance, primarily because there are no clear leading brand names in the solar industry. None of the brand names are particularly meaningful to these consumers, so they would be more interested in the reputation and longevity of the installer instead.

- In general, non-users across all markets do not place great importance on builder recommendations primarily because they view builders as trying to sell them something that the builder will profit from, rather than as something that will benefit the buyer.

  "If a builder pushed it too much, I'd be suspicious about what his gain is."

  "Builders just want to sell more upgrades to put more money in their pockets."

- Several respondents indicate that they may be more interested in solar energy if it did more than just heat the household water. They feel that heating their water will not save enough money to justify the purchase, but agree that if they could heat their home in the winter, then solar would look more interesting.

  "Why not have solar do more than just hot water – heat my home too."

  "Water alone is not enough."

FEELINGS TOWARD SOLAR SYSTEMS VIS-À-VIS OTHER UPGRADE OPTIONS

Solar is clearly not a priority when compared to other upgrade options that are available on new homes.

- Respondents were given a hypothetical $5,000 upgrade allowance and asked to select the two items that they would want to add from a list of available upgrade options. Within this scenario, almost none of the respondents selected a solar water heater as one of their two preferred upgrades.

  In fact, most of the respondents feel that a solar water heater may be about the last upgrade they would select. This lack of interest stems from a number of sources, including a lack of knowledge of solar systems, images of big ugly panels spread across their beautiful new homes, and the feeling that they will not save enough money to make it worth the trouble.

  Those who may consider solar as an upgrade would do so only if it made economic sense.

  > *"If it would save me money in the long run, I'd have to consider it over nicer cabinets or flooring, which would never save me anything."*

- Upgrades that most respondents select include items that are more difficult to install after completion of construction, such as granite counters, upgraded cabinets, and flooring. Some also feel that upgraded front yard landscaping, premium appliances, or garage built-ins are desirable as well.

- While most non-users are unlikely to select a solar water heater as an upgrade, they state that it would be acceptable if the home they like already has solar installed on it. However, they still prefer to have a choice of whether to install solar or not.

  "If it was already on the home, and did not increase the price of the home, it would be OK."

  "Unless it will definitely save me money, then I want the choice."

ANTICIPATED METHOD FOR APPROACHING A SOLAR SYSTEM PURCHASE

Non-users would shop around for a solar system, obtain competitive bids, and then probably pay in full for their system if they were going to purchase a solar water heating system. However, most agree that they would be required to purchase whatever the builder offers on a newly built home.

- When asked how they would go about purchasing a solar water heating system, these respondents indicate that they would want to talk to several solar providers, and would get competitive bids from these dealers. They would get names of dealers from the Yellow Pages, current solar users, the Internet and/or Consumer Reports.

  "You never just purchase the first thing you see."

- When talking with various dealers, they would want to know a number of things about the systems and the installers including:

  - lifetime of the systems
  - materials used
  - water temperature
  - tank capacity and recovery time
  - money savings
  - noise created
  - maintenance required

- While respondents would want to shop around, they feel that builders of new homes will probably not work with outside solar contractors. Consequently, these respondents feel that builders should offer solar water heating as an option, and should offer at least three different systems to choose from. They also would like the builders to offer a brochure about solar water heating. However, as previously mentioned, these consumers also express concern regarding builders recommending solar systems as added profit centers, rather than as superior equipment.

  "I would worry that if I used my own guy it would invalidate the roof warranty."

  "I want the builder to offer several choices, so I can compare and not feel like I have to take something not as good."

  "The builder may not let other suppliers or contractors in."

  "The builder should offer some information on solar – I'd have to be sold on it."

- When asked about adding a solar water heating system to their new mortgage, most respondents indicate that they would rather pay for it up front. Most of these consumers feel that adding the system to the mortgage would ultimately cost them much more over time with the interest. Only a few respondents feel that financing the solar system on their mortgage may make sense.

FEELINGS TOWARD POLITICAL INVOLVEMENT AND THE MILLION ROOFS INITIATIVE

While these respondents generally agree that solar is a good thing, and should grow in use, they are not in favor of government intervention or regulations in any way.

- Respondents want to have the choice to add or not add anything to their homes, including solar. And, they feel that there are already too many government regulations that do not even accomplish what they are intended to do. Some even feel that they might avoid areas that mandate usage of solar.

  "It's a joke. Look at emissions testing – that didn't clean up the air at all."

  "I don't want to be told that I have to do it."

  "I like flexibility and choices."

  "Communities should not restrict solar, they should give home owners a choice."

  "I want to see solar on the White House first. Then ask me to do it."

- Despite consumers wanting to make their own decisions, they do feel that if a community had solar on all of the homes, and the homes were comparable in price to similar homes in other communities, then they would probably go along with it.

  "If all of the homes had it, then it would probably be OK."

  "I wouldn't avoid a community I liked just because it had solar."

- These respondents also agree that cities should do what they can to help control the pollution problems.

  "Cities should pitch in."

Respondents feel that the Million Solar Roofs Initiative is a nice idea, and that cities should pitch in, but they feel that this initiative will not make much of a difference in the use of solar, the effect on our environment, or in their decision to use solar energy.

- While respondents agree that the Million Solar Roofs initiative is a nice concept, they feel that it does not sound substantial enough to make anyone feel that they are personally making a difference.

  "Anytime the goal is one million, and I'm only going to be one, then I don't relate to being part of the bigger picture."

  "One million in Phoenix might make a difference, but in the U.S. it is a small number."

  "It just sounds like politicians blowing smoke."

  "Programs like this look good in theory, but in practice are not that great."

  "I like the idea of conserving energy and reducing carbon dioxide, but will it really do that?"

- Consumers question government involvement regarding solar usage upon hearing this initiative. They feel that the government should spend more time focusing on bigger sources of pollution, such as making automobiles more efficient, rather than on household water heaters.

  "If solar was truly economical and beneficial to the environment, then people would already be buying solar, and the government would not need to get involved."

  "If we want to reduce dependence on foreign oil, there are other ways that will have a much bigger impact."

- While some respondents feel this initiative might motivate more companies to enter the solar energy arena, and consequently offer consumers better solar energy choices, others feel that this initiative will create numerous "fly-by-night" companies opening and then disappearing as did happen in the 1970's.

  "If it were that big, then there would be a big national provider of equipment that you could trust and rely upon like AT&T."

  "This would create competition, and companies would offer more attractive panels and cheaper pricing."

  "Fly-by-night manufacturers will come into the market and then not stand behind their products."

REACTIONS TO PHOTOGRAPHS OF ALTERNATE SOLAR PANELS

Respondents were very surprised and receptive to the newer, smaller types of solar panels that are available. However, because appearance is only a secondary factor in the purchase decision for these consumers, most do not express strong interest in looking into solar – even with these new styles.

- Respondents were shown several different new styles of solar panels, and one photograph of the traditional style of panels. (See Appendix for photographs.) Based upon the comparisons, respondents feel that any of the new systems are a vast improvement over the large older panel systems, and that any of the newer systems would be acceptable on their homes from an aesthetic standpoint. Many also feel that these new systems appear to require less maintenance than the older set-ups.

  "This is acceptable – any community would take this."

  "These are nice. They look like a skylight."

  "This is much better than what you see now."

  "I've only seen the gaudy kind that stick up across the whole roof. These are much better."

  "These look more simple than the old ones – more maintenance free."

  "One panel implies that there will be less problems and less to repair or replace."

- However, some of these respondents express concern that these smaller, flat panels would not produce enough hot water for their households, or may cause leaks in the roof.

  "It looks like there would not be enough output from a panel that small."

  "That one little panel couldn't possibly be enough for the whole house."

  "I would want to be sure this wouldn't cause the roof to leak."

  "This looks too small for such a big house."

- Because reactions to the appearance of the newer types of solar panels were overwhelmingly positive, some respondents feel that they would install one of the newer types of panels over the older ones unless the new ones were substantially higher priced or more efficient.

  "I'd still pick the new one I like unless there was a huge difference in efficiency or price."

  "The new ones look great. They blend right in with the roof."

- Among the newer styles, most prefer the completely flat or "hidden" panels, while some prefer the more boxed type.

  "The flatter ones are less visible. They just blend in with the roofline of the house."

  "The completely flat one looks like there may be roof leakage problems. I prefer the box on top."

  "The less obvious the better."

- Despite the positive input on the newer systems, some respondents remain either uninterested or ambivalent about purchasing a solar system due to the satisfaction level with their current gas powered systems.

  "I can only save $5 to $10 a month. That's just not enough."

  "It's still something else to break down."

APPENDIX

SCREENING QUESTIONNAIRES

DISCUSSION GUIDES

PHOTOGRAPHS

SOLAR GROUPS - NOVEMBER, 1997

Phoenix

Users ( )

RESPONDENT NAME:_____
PHONE NUMBER:_____
CITY:_____
CALLBACK APPT: DATE:_____ TIME:_____

(ASK TO SPEAK TO NAME ON THE LIST. IF NOT HOME, SET CALLBACK APPOINTMENT.)

Hello, my name is _____ from _____. We're conducting a marketing research study about energy usage in your home, and I'd like to ask you a few questions if I may. I can assure you that we are not trying to sell you anything. We just have a few short questions.

1. RECORD SEX: Male.....( ) TRY FOR A
   Female.....( ) MIX

2. Do you, or does any member of your family, work in any of the following types of businesses? (READ LIST. RECORD BELOW.)

Marketing research	( )	
Real estate development	( )	
Construction contracting	( )	IF YES TO ANY, THANK AND TERMINATE
A solar energy contractor	( )	
Gas or electrical energy	( )	

3. Which of the following best describes the way that the water in your home is heated. (READ LIST AND RECORD BELOW.)

Electricity and solar combined	( )	
Gas and solar combined	( )	CONTINUE
Electricity only	( )	
Gas only	( )	SWITCH TO NON-USER SCREENER
Don't know	( )	

4. Which of the following statements is most accurate? (READ EACH STATEMENT, AND RECORD ONE RESPONSE.)

My home was already equipped with a solar water heater when I purchased it	( ) NO MORE
I specifically requested that a solar water heater be installed in my home after it was built	THAN THREE ( ) FROM THIS SET
I specifically requested that a solar water heater be installed in my home while it was being built	( ) TRY TO GET
My builder encouraged me to install a solar water heater in my home when it was being built	A MAJORITY FROM ( ) THIS SET
The city where I purchased requires that all new homes be equipped with solar water heaters	( ) NO MORE THAN THREE

5. How long have you had a solar water heater installed in your current home?

Less than a year	( )	TRY TO RECRUIT
One year	( )	A MAJORITY WHO
Two years	( )	HAVE USED SOLAR
Three or more years	( )	A LONGER TIME

6. Overall, how satisfied would you say you have been with the solar water heating unit in your home? (READ LIST AND RECORD ONE RESPONSE.)

Extremely satisfied	( )	
Somewhat satisfied	( )	TRY TO GET
Neither satisfied or dissatisfied	( )	A MIX OF THESE
Somewhat dissatisfied	( )	
Extremely dissatisfied	( )	THANK AND TERMINATE

Now I'd like to ask you just a couple of questions for classification purposes so that I can know we are talking with a wide range of people.

7. What is the size of your home? Is it... (READ LIST)

Under 1,500 square feet	( )	
1,500 - 1,800 square feet	( )	
1,900 - 2,200 square feet	( )	
2,300 - 2,600 square feet	( )	MUST GET
2,700 - 3,000 square feet	( )	A MIX ACROSS
3,100 - 3,400 square feet	( )	HOME SIZES
3,500 - 3,900 square feet	( )	
4,000 square feet or more	( )	

8. How many people, including all adults and children are currently living in your home?

One	( )	
2	( )	TRY TO RECRUIT
3-4	( )	A MIX OF HH SIZES
5+	( )	

9. What amount best represents your total household income? (READ LIST)

Under $50,000	( )
$50,000-$75,000	( )
$76,000 - $100,000	( )
Over $100,000	( )

We would like to invite you to participate in a discussion we are conducting on a solar water heater with people like yourself that will last about 2 hours. The discussion will be held on (date) from (time). The location will be in the (name) marketing research facility. You will be paid $50 for your participation. Would you be willing to participate?

Yes	( )	RECRUIT AND PLACE IN GROUP
No	( )	THANK AND TERMINATE

Recruited by:_____ Date:_____

Confirmed by:_____ Date:_____

SOLAR GROUPS - NOVEMBER, 1997 NON-USERS

RESPONDENT NAME:_____
PHONE NUMBER:_____
CITY:_____
CALLBACK APPT: DATE:_____ TIME:_____

Hello, my name is _____ from _____. We're conducting a marketing research study about energy usage in your home, and I'd like to ask you a few questions if I may. I can assure you that we are not trying to sell you anything. We just have a few short questions.

1. RECORD SEX: Male.....( ) TRY TO GET
   Female.....( ) A MIX

2. Do you, or does any member of your family, work in any of the following types of businesses? (READ LIST. RECORD BELOW.)

Marketing research	( )	
Real estate development	( )	
Construction contracting	( )	IF YES TO ANY, THANK AND TERMINATE
A solar energy contractor	( )	
Gas or electrical energy company	( )	

3. Have you ever owned a home equipped with (ITEM)? (ASK AND RECORD FOR EACH BELOW)

A solar water heater	( )	ASK Q.4
A gas water heater	( )	SKIP TO Q.5
An electric water heater	( )	
A gas stove	( )	
An electric stove	( )	
A gas clothes dryer	( )	
An electric clothes dryer	( )	

4. Is the home you currently live in equipped with a solar water heater?...(READ LIST)

Yes	( )	SWITCH TO USER SCREENER
No	( )	THANK AND TERMINATE

5. Are you planning to purchase a new home...(READ LIST)

Within the next twelve months	( )	→CONTINUE
In the next 12 - 24 months	( )	→NO MORE THAN THREE
Longer than two years from now	( )	THANK AND TERMINATE

6. How many new home communities have you visited within the past six months?

None	( )	THANK AND
One	( )	TERMINATE
2-3	( )	
4-5	( )	CONTINUE
6 +	( )	

7. Are you considering purchasing... (READ LIST)

A newly built home only	( )	CONTINUE
Both new and resale	( )	
A resale home only	( )	THANK AND TERMINATE

8. How many square feet are you looking at purchasing in you next home? Is it... (READ LIST)

Under 1,500 square feet	( )
1,500 - 1,800 square feet	( )
1,900 - 2,200 square feet	( )
2,300 - 2,600 square feet	( )
2,700 - 3,000 square feet	( )
3,100 - 3,400 square feet	( )
3,500 - 3,900 square feet	( )
4,000 square feet or more	( )

9. What is the price range that you are considering for your next home purchase? Would you say it is... (READ LIST)

Under $100,000	( )	THANK AND TERMINATE
$100,000 - 150,000	( )	
$151,000 - 200,000	( )	
$201,000 - 250,000	( )	
$251,000 - 300.000	( )	
$301,000 - 350.000	( )	
Over $350,000	( )	

RECRUIT A MIX OF STATER, MOVE-UP, AND LUXURY HOME BUYERS IN EACH GROUP. THIS IS DEFINED AS FOLLOWS IN EACH CITY:

	ORLANDO	PHOENIX	SACRAMENTO
Starter	1,500 - 1,800 $100 - 150K	1,500 - 1,800 $100 - 150K	1,500 - 1,800 $100 - 150K
Move-up	1,900 - 3,000 $151 - 300K	1,900 - 2,600 $151 - 250K	1,900 - 3,000 $151 - 350K
Luxury	3,100+ $301K+	2,700+ $251K+	3,100+ Over $350K

10. If you were to purchase a home that is being newly built, and your builder gave you the option of installing some upgrades, how likely would you say you would be to purchase a (ITEM)? Would you say that you are...(READ LIST FOR EACH OF THE FOLLOWING ITEMS. RECORD RESPONSE FOR SOLAR ONLY)

ASK FOR: Granite counters / Premium appliances / Upgraded flooring / Solar water heating unit

Extremely likely	( )	
Somewhat likely	( )	TRY TO GET
Neither likely or unlikely	( )	A MIX OF THESE
Somewhat unlikely	( )	
Extremely unlikely	( )	THANK AND TERMINATE

Now I'd like to ask you just a couple of questions for classification purposes so that I can know we are talking with a wide range of people.

11. How many people, including all adults and children are currently living in your home?

One	( )	
2	( )	TRY TO RECRUIT
3-4	( )	A MIX OF HH SIZES
5+	( )	

12. What amount best represents your total household income? (READ LIST)

Under $50,000	( )	THANK AND TERMINATE
$50,000-$75,000	( )	
$76,000 - $100,000	( )	CONTINUE
Over $100,000	( )	

We would like to invite you to participate in a discussion we are conducting on a solar water heater with people like yourself that will last about 2 hours. The discussion will be held on (date) from (time). The location will be in the (name) marketing research facility. You will be paid $50 for your participation. Would you be willing to participate?

Yes	( )	RECRUIT AND PLACE IN GROUP
No	( )	THANK AND TERMINATE

Recruited by:_____ Date:_____
Confirmed by:_____ Date:_____

USERS
SOLAR DISCUSSION GUIDE

INTRODUCTION (10 minutes)
- Explain room and procedures
- Intro: Name, #people in HH, sq. ft. in home, # years in home, # years with solar

PURCHASE PROCESS (20 minutes)
- How did you first hear about solar water heating
- Why did you initially decide to look into solar water heating systems
  - What were the primary factors in deciding to purchase this
  - If not required by city, how would you rate the importance of the following in your decision to purchase:
    Price / Maintenance / Environment / Long term money savings / Efficiency
    Brand name / Tax benefits / Appearance
- How did you go about finding and selecting a solar contractor
  - What did they explain to you
- Did you look at more than one system
  - Where did you hear about alternatives
  - Why did you want to see more than one
- Did you get competitive pricing on the system you purchased
- Is the system you are currently using your first one in the home where you are living?
  - Why did you decide to replace your old system

TYPE OF SYSTEM INSTALLED (10 minutes)
- Describe the type of solar system in your home
  - Brand name / # panels
  - Does it work in conjunction with gas or electric

SOLAR USAGE / MAINTENANCE (15 minutes)
- How much energy do you save each month by using your solar system
- How much money do you save each month
- What, if anything, do you do to maintain your solar system
  - How often is it maintained
  - How much is spent annually on maintenance
  - Who do you call when you are having a problem / who does the actual work
  - What types of problems have occurred that have needed maintenance

FEELINGS TOWARDS SOLAR SYSTEMS (15 minutes)

- What do you like in particular about your solar system
- Has your experience with your solar water heater been what you expected
  - Why / Why not
- Do you think that the solar provides more hot water, hot water more quickly than a water heater alone would provide, or makes no difference
- How do you feel about the appearance of your solar system
- Do you feel that using solar is beneficial to the environment / In what ways
- What, if anything, do you dislike about your solar system
- If you were building a new home now in an area where solar was optional, would you purchase a solar system for this home
  - Reasons why / why not
  - Would you purchase the same type of system you have now or something different
    - If different: What would you want instead
  - Would you want to be able to include the solar system in your mortgage / Why
- Would you recommend solar water heating to your friends / Why

REACTIONS TO DIFFERENT SYSTEMS (20 minutes)

(EXPLAIN: I have several different types of solar water heating systems that I want to show you. I'll show them to you one at a time and we'll discuss each one.)

- What do you think of this system overall
- What do you think would be good about this system
- Is there anything you might change about this system
- If you were purchasing a new system, would you be likely to select this one
  - Reasons why
- How much would you expect to pay for this system

(AFTER ALL SYSTEMS HAVE BEEN DISCUSSED, ASK:)

- If you were purchasing a new system, and were shown all of the systems we just discussed, which one would you select
  - Reasons why selected system
  - Reasons why rejected other systems

NON-USERS
SOLAR DISCUSSION GUIDE

INTRODUCTION (10 minutes)

- Explain room and procedures
- Intro: Name, #people in HH, Size home looking for, areas looking at

AWARENESS AND IMAGE (20 minutes)

- Are you aware of alternate ways to heat the water in your home
  - What are they

- What do you know about solar water heating systems
  - Have you ever seen one
  - How do they work
  - What do they look like (size, appearance, location)
  - How much do they cost
  - What is involved in maintaining them
  - How much energy do they save monthly
  - How much money do they save monthly
  - Can you use them all or just part of the year

- What are your sources of awareness for solar water heating systems
- Overall, what do you think the advantages of a solar water heating system would be
- What, if anything would be a disadvantage of a solar water heating system

PURCHASE INTEREST (30 minutes)

- When you purchase your next home, do you think you might install a solar water heating system
  - Why / why not
  - How does solar compare to other available options

- If you were purchasing a new home and were to add a solar water system to the mortgage, how much more a month would you be willing to pay to have a solar water heating system
  - What if that cost were partially off-set by energy savings each month
  - What if the cost were completely off-set each month
  - What if you would actually save money monthly as compared with a regular water heater
  - How much would you have to save each month to get you to purchase solar

- If you decided to purchase a solar heating system, how would you rate the importance of the following in your decision to purchase:

  Price / Maintenance / Environment / Long term money savings / Cash flow
  Brand name / Builder recommendation / Tax benefits / Appearance

- If a builder gave you an upgrade allowance, and offered a list of upgrades to choose from such as upgraded flooring, maple cabinets, ceiling fans, upgraded appliances, and other typical upgrade options including a solar water heating system, how would you spend our allowance. Let's rank order our choices.

- If you were going to install a solar water heating system, how would you go about selecting one
  - What kind of information would you seek out / from what sources
  - Would you shop around for different types of systems
  - Would you get a competitive bid

- If your builder recommended solar heating to you, would you be more likely to install it /Why
- Should solar water heating be a standard on your new home or should this be an added option
- Would you expect to be offered a choice of more than one system / Why
- Would you get competitive pricing on the system your builder offers
- Would you expect to include the cost of the system in your mortgage / If not, why

<u>POLITICS (15 minutes)</u>
- Should cities mandate that new home communities install solar water heating systems on all homes / Why
- Should builders or developers restrict the use of solar based upon its appearance
  (EXPLAIN THE MILLION SOLAR ROOF INITIATIVE)
  - What do you think of this overall
  - What do you like about this program
  - What, if anything, do you feel should be changed about this program
  - Would this influence your decision to purchase a solar water heating system in the next home
  - In general, should cities help the environment by mandating clean power sources

<u>REACTIONS TO DIFFERENT SYSTEMS (20 minutes)</u>
(EXPLAIN: I have several different types of solar water heating systems that I want to show you. I'll show them to you one at a time and we'll discuss each one.)
- What do you think of this system overall
- What do you think would be good about this system
- Is there anything you might change about this system
- If you were purchasing a new system, would you be likely to select this one / Why
- How much would you expect to pay for this system

(AFTER ALL SYSTEMS HAVE BEEN DISCUSSED, ASK:)
- If you were purchasing a new system, and were shown all of the systems we just discussed, which one would you select
  - Reasons why selected system
  - Reasons why rejected other systems
  - Let's go through each of these again and rate them on their appearance
  - If a solar system looked like this, would you approve of it being installed on the front of a house
  - (If appearance is a problem, ask:) What should the systems look like